CLAIMS

1. A lithium ion secondary battery comprising:

a positive electrode capable of absorbing and desorbing lithium ion;

a negative electrode capable of absorbing and desorbing lithium ion;

a porous film interposed between said positive electrode and said negative electrode; and

a non-aqueous electrolyte;

wherein said porous film is adhered to a surface of at least one of said positive electrode and said negative electrode,

said porous film comprises a filler and a resin binder,

a content of said resin binder in said porous film is 1.5 to 8 parts by weight per 100 parts by weight of said filler, and

said resin binder includes an acrylonitrile unit, an acrylate unit, or a methacrylate unit.

2. The lithium ion secondary battery in accordance with claim 1, wherein an average pore size of micropores in said porous film obtained by a Bubble-point Method is 0.02 to 0.09 μm.

3. The lithium ion secondary battery in accordance with claim 1, wherein an elongating percentage of said porous film is 15% or more.

4. The lithium ion secondary battery in accordance with claim 1, wherein an amount of said resin binder is smaller in a first surface side where said porous film is in contact with said surface of said electrode, and larger in a second surface side opposite to said first surface side.

5. The lithium ion secondary battery in accordance with claim 1, wherein said filler comprises a mixture of a large particle group and a small particle group, and an average particle size A of said large particle group and an average particle size B of said small particle group satisfy the formula (1):

$$0.05 \leq B/A \leq 0.25.$$

6. The lithium ion secondary battery in accordance with claim 1, wherein said resin binder comprises rubber particles of core-shell type, and said rubber particles have an adhesive surface portion.

7. The lithium ion secondary battery in accordance with claim 1, wherein said filler includes at least Al_2O_3.

8. The lithium ion secondary battery in accordance with claim 1, wherein said resin binder has a decomposing temperature of 250 °C or more.

9. The lithium ion secondary battery in accordance with claim 8, wherein said resin binder has a crystalline melting point of 250 °C or more.

10. The lithium ion secondary battery in accordance with claim 4, wherein said porous film comprises a single film, and an amount of said resin binder gradually increases from said first surface side toward said second surface side.

11. The lithium ion secondary battery in accordance with claim 4, wherein said porous film comprises a plurality of films and a content of said resin binder in the total of said filler and said resin binder contained in a film positioned at said second surface side is higher than a content of said resin binder in the total of said filler and said resin binder contained in a film positioned at said first surface side.

12. The lithium ion secondary battery in accordance with claim 4, wherein a content of said filler in the total of said filler and said resin binder contained in a surface portion of said second surface side of said porous film is 70 to 98 wt%, and a thickness of said surface portion is 20% of the thickness of said porous film.

13. The lithium ion secondary battery in accordance with claim 1, wherein said positive electrode and said negative electrode are wound interposing only said porous film.

14. The lithium ion secondary battery in accordance with claim 1, wherein said positive electrode and said negative electrode are wound interposing said porous film

and a separator.

15. A manufacturing method of the lithium ion secondary battery in accordance with claim 1, comprising the steps of:

(a) preparing a paste including 100 parts by weight of a filler, 1.5 to 8 parts by weight of a resin binder including an acrylonitrile unit, an acrylate unit, or a methacrylate unit, and a dispersion medium of said filler,

(b) applying said paste to a surface of at least one of a positive electrode and a negative electrode, and

(c) drying the paste applied on the surface of said electrode at a temperature of not less than 100 °C to not more than 180 °C.